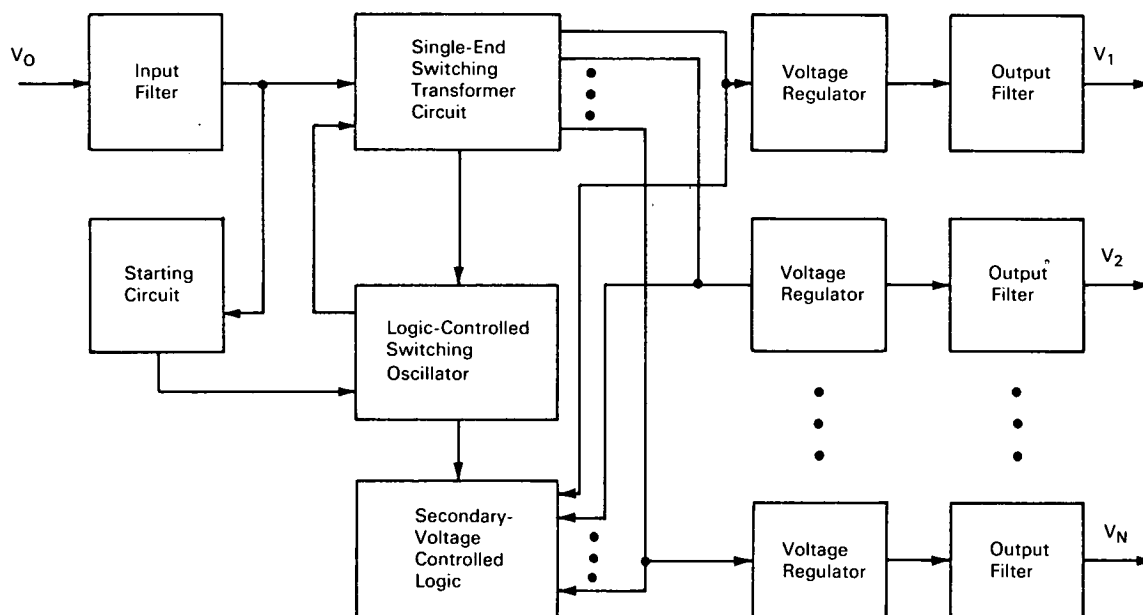


NASA TECH BRIEF



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Isolated, Multiple-Output Voltage DC-to-DC Converter



An investigation has been made and reported concerning the analysis, design, and construction of a dc-to-dc converter to provide power for a television transmitter to be used in space vehicles. The isolation is accomplished by the use of a single-end switching transformer circuit. The converter is completely solid state.

The isolated multiple-output voltage dc-to-dc converter is divided into seven distinct sections: (1) input filter, (2) starting circuit, (3) single-end switching transformer circuit, (4) logic-controlled switching oscillator, (5) secondary-voltage controlled logic, (6) voltage regulators, and (7) output filters. The single-end switching transformer is driven with a constant-width pulse, the frequency of which is directly

proportional to the output power of the converter. The secondary voltages are regulated by the use of negative feedback through the secondary voltage-controlled logic. The voltage regulators are used to provide additional regulation. The input and output filters are included to reduce the radiofrequency interference output of the converter.

The equations describing the single-end switching converter are developed for the ideal case. The design of each section is discussed in the report in detail. A multiple-output-voltage prototype converter was designed and constructed. The prototype was subjected to electromagnetic compatibility tests and temperature tests. The results of the tests and the performance of the converter are presented in the report.

(continued overleaf)

Notes:

1. The converter provides: 10 watts maximum output power; independent output voltages of +28 volts, +12 volts, and -12 volts; output voltage regulation on the order of ± 0.1 percent over the temperature range of -25° to 90°C ; and ripple of less than 20 millivolts peak-to-peak on the output voltage. The converter has an overall operating efficiency of approximately 60 percent under all conditions of operation.
2. Further information concerning this innovation is presented in NASA CR-61737, "Analysis and Design of an Isolated Multiple-Output-Voltage DC-to-DC Converter", April 1968, available from the

Clearinghouse for Federal Scientific and Technical Information, Springfield, Virginia 22151; price \$3.00 (microfiche \$0.65). Inquiries may also be directed to:

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No patent action is contemplated by NASA.

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